

# Discarding used organic samples in a forensic lab: the manifold materialities of human remains

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## Abstract

In this article we explore the relational materiality of fragments of human cadavers used to produce DNA profiles of the unidentified dead at a forensic genetics police laboratory in Rio de Janeiro. Our point of departure is an apparently simple problem: how to discard already tested materials in order to open up physical space for incoming tissue samples. However, during our study we found that transforming human tissues and bone fragments into disposable trash requires a tremendous institutional investment of energy, involving negotiations with public health authorities, criminal courts and public burial grounds. The dilemma confronted by the forensic genetic lab suggests not only how some fragments are endowed with more personhood than others, but also how the very distinction between human remains and trash depends on a patchwork of multiple logics that does not necessarily perform according to well-established or predictable scripts.

**Key words:** Relational materiality, human remains, judicial evidence, anthropology of science, identification technologies, forensic genetics

## Introduction

Dead bodies or parts thereof are not a new topic for social scientists. Over a period of three decades and more, analysts have followed the exhumed corpses of illustrious figures as they are expatriated, repatriated and lodged in mausoleums or dislodged and desecrated – the best-known examples being those of Eva Peron, Stalin and Atatürk.<sup>1</sup> On the other hand, they have also observed the powerful results following the excavation of mass graves and the identification of supposedly anonymous victims of genocide and civil war.<sup>2</sup> On another level of political contention, researchers have themselves been actors in disputes concerning the mortal remains of groups they study. Thus, we encounter controversies over the brain of Ishi, the last of the Yahi Indians, stored in a warehouse of the Smithsonian Institute;<sup>3</sup> over the biobanks formed with the blood of Yanomami Indians and stocked by geneticists and physical anthropologists in North and South American universities;<sup>4</sup> and

over the custodianship of the contents of a pre-historic tomb found on a Washington State Indian reservation.<sup>5</sup> Finally, scholars in the field of medical anthropology have explored how the line between a live human body and a corpse has been redefined through the performance of man-made interventions.<sup>6</sup> These various examples serve to underline how the materiality of human bodies – objects that, aside from their eventual uses, can be seen, smelled and felt – renders them potent symbols capable of mobilising political ideologies, ethnic identities and humanitarian causes.

In this article, however, we are not dealing with political heroes, nor with hotly debated ethnic issues, nor even with scientific breakthroughs, but, rather, with the most humdrum of corpses in need of an identity . . . vagrants, murder victims and just plain unclaimed or long-dead bodies that cannot be clearly identified by routine procedures. We propose here to explore the complexities involved in the disposal of fragments of human cadavers at the Instituto de Pesquisa e Perícias em Genética Forense<sup>7</sup> (IPPGF), a forensic genetics laboratory run by the state police in Rio de Janeiro.

We start with an apparently simple problem posed by the lab's director: how to discard already tested materials in order to open up physical space for the new tissue samples needed for the lab's principal activity: the definition of DNA profiles of unidentified corpses. However, in the course of our study we discover that the disposal of this material is, in fact, more complicated than it would appear. To transform human tissues and bone fragments into disposable 'trash' requires a tremendous institutional investment of energy, involving negotiations with public health authorities, criminal courts and public burial grounds. Along the way, the very meaning of the material navigates through a complex choreography touching on issues of pollution, legal evidence and the limits of what is considered 'human', worthy of special deference.

This article is a result of observations and collaborative dialogue carried out by an anthropologist (first author) and the director of the forensic genetics police lab under study (second author) during the first months of 2016. We should remember that the collaborative effort between anthropologist and 'native' in the analysis of a particular sociotechnical network is not new in the field of science and technological studies.<sup>8</sup> As recently stated by De La Cadena and Lien.

A variety of new endeavors are exploring how interdisciplinary configurations that include biologists, ecologists, and geneticists might generate still other forms of anthropology and STS by forcing us to encounter scientists and scientific knowledge-making practices not as objects of study, but as collaborative research partners.<sup>9</sup>

In our case, the co-authorship by a specialist from the very field under study, notwithstanding the inevitable challenges of an 'insider ethnography',<sup>10</sup> helps to clarify the particular positioning of our analytical perspective.<sup>11</sup> The dialogue between author-analysts from different disciplinary traditions is designed to configure a sort of 'third space' that enhances distanced reflexivity on all sides.<sup>12</sup>

## The relational materiality of dead bodies

Controversies over the treatment of stem cells, the legalisation of abortion and the disposal of redundant embryos produced during assisted reproduction furnish examples of how there is no set consensus about when and in what form human life begins. In this article we address the problem of when an object ceases being human. How and through what sort of negotiations is the line drawn between a cadaver – feared or revered – and organic waste? This distinction not only reveals the work invested in the signifying of certain material objects – it has direct bearing on the objects' trajectory. How one defines an object has consequences for its ultimate destination – whether it ends up displayed in a museum, incinerated, buried in a territory reserved for some category of the sacred or simply jumbled together with the household trash.

For the purpose of our analysis we view cadavers through the prism of 'relational materiality', a notion formulated by John Law and Annemarie Mol<sup>13</sup> to overcome social/material dualities. Going beyond the simple affirmation that 'outside their interactions [material objects] have no existence, no reality', Law and Mol underline the importance of strategy for the organisation and production of (eternally insecure) distinctions:

It is not possible to conceive of what might be unless it can be re-presented [sic]. Imagined. Or (this is the point of strategy, what makes it possible) to represent and imagine it in materials that are relatively simple, relatively malleable, and relatively tractable. So strategy is also the (attempted) performance of material distinction.<sup>14</sup>

From this 'non-humanist' perspective, there is no taking for granted exactly which material objects are to be considered 'human', and under what circumstances.

In the case of the IPPGE, administrators must negotiate with a series of relevant actors in the attempt to move certain materials out of the lab. In the course of this strategising, the materials are resignified in different ways – as human remains worthy of special consideration, as legal evidence and as organic refuse liable to pollute the environment. The material itself plays an active role in negotiations as – in interactions with environmental conditions – its performance is construed as overly bulky, putrid or deteriorated to the point of being useless.

The social status of a person before his or her death may also have something to do with the ways dead bodies are enacted. Historians remind us that, until the end of the nineteenth century, the death of anonymous commoners could pass with little fuss. Soldiers killed in battle in the defence of the nation rarely received individual burial.<sup>15</sup> When their names were remembered it was on a memorial plaque, often quite removed from the person's mortal remains. The idea that authorities should provide individualised burial space in a public cemetery even for the humblest members of society emerges with modern notions of health and nationhood: cadavers were no longer seen as 'irrelevant material that could be trashed (or treated like trash) but as politically significant persons that needed to be tracked, ordered, and observed'.<sup>16</sup>

With the advance of medical sciences, controversies over the corpse's bodily integrity deepened. M. Sappol, describing developments in the United States, recounts how, before the first nineteenth-century laws regulating the use of cadavers for medical research, students of human anatomy had not infrequently resorted to grave-robbing in order to gain practical knowledge through dissections.<sup>17</sup> However, even after the legalisation of the use of cadavers for teaching and research, popular revolts against this practice were not uncommon – particularly among those who identified with or sympathised with the pool of likely candidates for dissection (deceased indigents, criminals, the mentally insane and other social outcasts). The mixture of body parts and trash found during excavations close to past schools of medicine is but one indication that cadavers used in medical research and training have not always been treated with the respect usually accorded to the deceased of society's more respectable categories.<sup>18</sup>

The growth in importance of the individualised burial plot, together with popular indignation against mass graves today, raises particular logistical questions. O'Neil,<sup>19</sup> for example, paints a vivid picture of overpopulation in Guatemala City's public cemetery due, in part, to years of civil war as well as to present-day high rates of homicide. However, piled-up coffins awaiting space for burial in the public cemetery, or even funeral urns proliferating beyond the limits of local columbariums, appear to be a problem in many of the world's contemporary metropolises. From London and Hong Kong to Rio de Janeiro, city officials are rewriting the rules on this matter, not only to avoid environmental pollution<sup>20</sup> but also to encourage the re-use of burial spaces. With the dwindling of space for new arrivals, aggressive policies have been implemented to exhume the dead and remove their remains to ossuaries and, finally, to incineration. Corpses that before, for the price of a funeral, were implicitly afforded a resting place for all eternity, face rental contracts that are more restrictive than ever. Time limits are stipulated – in some places as much as ten years, in others, as little as three – for relatives to start paying regular rent lest the deceased person's grave be disturbed.

As O'Neill has suggested, in the present neoliberal world order the political significance of the corpse as well as the deferential treatment afforded to a person's post-mortem body appear to cease with the termination of payments. One might say that the ability to honour one's financial obligations becomes a key factor in defining the thin line between mortal remains and trash. However, in the modern state there are many other sorts of relations that account for the cadaver's particular kind of materiality.

### **Naming the human: technologies of identification**

In present-day modes of government there are strict norms for the treatment of human cadavers. It may be that paupers are buried with summary funeral rites, in shallow graves with short-term rights of occupancy. Nonetheless, excepting situations of wholesale massacre and war, deference toward the human element mandates the individual identification of a person's mortal remains – an identification that implies a name and personal biography.

The importance of attributing a name leads us directly to the door of the genetic forensics laboratory in Rio. While the lab is also involved in the analysis of vestiges from crime scenes and rape victims, the activity that occupies most of the staff's time and energy is the identification of unidentified cadavers.<sup>21</sup> For example, one of the lab's first cases in 2005 dealt with a criminal fire in which six passengers of a city bus had been burned alive. The lab technicians were challenged to put names to the charred bodies. Other cases might concern the murder victims of drug cartels – e.g., 'microwaved' cadavers, set in the middle of a pile of car tyres and burned beyond recognition.<sup>22</sup> Sometimes the bodies are those of drowning victims that have been in the water too long, or they concern mortal remains that – for other reasons – have deteriorated too much to permit identification through fingerprints or the observation of distinctive body features. In some cases it might be possible to identify a cadaver through the deceased's dental records, but this sort of information is lacking or even non-existent in the cases of many lower-income individuals. Thus, time and again, DNA technology provides the one remaining hope to know exactly who died.

To carry out this all-important function, the genetic forensics lab does not need and, in fact, is never sent a whole body. Rather, it receives bone fragments or pieces of other human tissue, normally not more than a few centimetres long, that have been cut from the cadaver by forensic specialists at the city morgue and sent in sealed plastic envelopes to the IPPGF. Rigorously documented from the moment it enters the lab's premises, the bone fragment or tissue is processed, through a sophisticated protocol, as an artefact of scientific investigation. Each step of the material's trajectory is registered: samples must be protected as much as possible against contamination by extraneous DNA, evidence must be protected against tampering. To a certain extent, scientific and judicial concerns converge toward the documentary individuality of each sample, maintaining the distinction between it and a common waste product.

The lab's work, however, does not end with the production of a 'profile' – which, one should remember, is a code, not a name. To attach a personal identity to the cadaver, it is necessary to match the 'questioned sample' – i.e. the DNA extracted from the corpse – with a 'reference sample' – i.e. the DNA of a close living relative. Normally, together with the envelope containing the duly numbered and described tissue sample or bone fragment sent by the morgue, the genetics lab also receives the result of a police inquiry that has turned up the names and telephone numbers of the unidentified cadaver's possible identity and relatives. Following this lead, the lab appoints a day and time for the potential relative to encounter the trained technicians who will take a saliva sample by swabbing the subject's mouth with a cotton-tipped applicator.

The strategies surrounding the projected future of the human fragments that arrive in the IPPGF establish a chain of connections between multiple actors that represent multiple materialities. The lab technicians invest in the scientific rigour of their materials, hoping to produce a clear DNA profile; the relatives hope that their own bodily traces, combined with the bone and tissue fragments, will furnish clues as to the disappearance of a loved one. In this case, different strategic logics,

performing material relations in their own distinctive way, seem to merge toward a common goal. However, in a context of strategic competition there may be pressure to see materials perform in new ways that are not entirely compatible with other, previous logics. As we will see in the following section, innovations in DNA technologies thrust the judiciary to the forefront of strategising in the forensic genetics lab, presenting the bones and tissues in a new light.

### Technology prolongs the cadaver's use

In November 2015 the State Prosecutor's Office circulated a memo to the various municipal morgues in the state of Rio de Janeiro ordering that, before interring any unidentified body, they were to collect a tissue sample and send it to the forensic genetics lab in the state capital, where its DNA profile would be defined and the genetic material would be stored for future investigation. The State Prosecutor's concern for the preservation and storage of biological samples from unidentified cadavers results from technological changes introduced during the past decade into the Brazilian police activities. The combined interests of university researchers, international police forces and biotech enterprises began soon after the turn of the century to move towards a broader, more efficient use of DNA tests for criminal investigation in Brazil.<sup>23</sup> In 2002, the first post-graduate studies course in genomic sciences was opened in a Brazilian university. Around the same time, forensic specialists – from both Brazil and abroad – began to organise training sessions to bring technicians working in the various police labs up to date on the most recent possibilities of DNA technologies. Over the next few years, professional conference meetings on forensic genetics and science-based criminology proliferated throughout the country, convincing an ever-growing number of experts that DNA technologies of identification were essential for any modern police force. As the result of of organised lobbying, a new Bill was introduced in the National Congress in 2011, promising great strides in the fight against crime. Passed in 2012 and enacted in record time, the new legislation established a national data bank with the DNA profiles of criminal offenders – data that, channelled through standardised software, could be linked into an international network including the US Federal Bureau of Investigation and INTERPOL.<sup>24</sup>

As the Bill awaited congressional approval, articles on the potential benefits of this new technology began to circulate in the national media. Stories imported from England or the United States told of serial killers finally caught, or of wrongly convicted prison inmates finally proved innocent – all thanks to the databanks. As a result, police and judicial authorities throughout the country began to understand the importance of preserving samples of human tissue for DNA analysis. Semen stains from rape cases, scene-of-crime vestiges from murder cases, as well as tissue from unidentified corpses were all now potential sources for the production of genetic databanks. More and more, these samples were seen as court evidence that might complement or even take the place of eye-witness testimonies – if not now, then at some future date. DNA profiles, it was argued, did not fade as time passed, nor was this 'objective' information tainted by witnesses' emotional perceptions.

The same advantages would be valid for unidentified cadavers. DNA databanks promised an eventual solution to unsolved mysteries.<sup>25</sup> But, obviously, for the system to work it would be necessary to guarantee the input of an ever-greater number of profiles into the databank.

The Rio de Janeiro State Prosecutor's Office was evidently convinced that centralising the custody of materials in the IPPGF would guarantee that the evidence would be preserved and channelled toward the proper goal. The director of the genetics lab concurred that it would be logical for the lab to receive these materials, establish DNA profiles and enter the information into the centralised databank. The only problem was that the lab could not possibly receive new materials for sheer want of space.

### **Dealing with limited space: preserving stocks, discarding refuse, minimising input**

The Rio de Janeiro Forensic Institute is located in an urban area not far from the centre of town. The one-storey building is sandwiched between the police academy, the military police museum and what used to be the state police hospital (now replaced by precinct headquarters). The Institute is divided into two major areas. On one side, connected by a narrow corridor, the administrative space consists of a reception desk, three small offices equipped with computers and a collection room, none of which measures more than 12 square metres in size. On the other side, occupying 230 of the Institute's total 325 square metres, a larger, more open laboratory space with lateral doors leading into the pre-PCR, PCR and post-PCR<sup>26</sup> rooms ends in a wide corridor leading to a cold-storage chamber that is presently out of use. Along the walls and corridor of the lab are a dozen refrigerators or freezers carefully marked with labels reading 'closed cases', 'open cases', 'evidence for rebuttals', 'DNA extractions' and sub-sections marked 'tests in course', 'concluded tests to be filed' and 'inconclusive results'. With varying degrees of refrigeration, these banal, kitchen-size units (none is larger than what an average family might have in their home) must guarantee the proper conservation of everything from commercial 'kits' of reactants imported from abroad and sperm or blood samples taken from crime scenes to the as-yet-untested samples of human tissue.

The process of investigation implies three overlapping spaces that produce different sorts of trash. There is the humdrum, everyday office trash of paper memos, computer print-outs and general administrative records that will be picked up by the city services and delivered to the public dump.<sup>27</sup> There are the plastic gloves, cotton swabs and other hospital-like accessories of the 'collection room' that are discarded after the visit of each new potential relative. And, in the forensic lab, there are the glass slides, test tubes, imported reactants and other chemicals as well as the 'questioned samples' consisting of bone fragments and pieces of tissue.

The lab relies on a specially contracted firm to collect on a weekly basis, and properly dispose of, not only its potentially toxic waste (including, aside from sharp instruments, biological refuse left over from the sample collection from living relatives) but also chemical by-products of its lab analyses. Even though syringes are



no longer necessary (saliva having replaced blood as sample material for tests), the collection room is never without the sturdy, square cardboard box stamped with the warning 'Danger: do not fill beyond this line' where potentially contaminated discards await pick-up by a commercial disposal service. This measure placates neighbours who have more than once noisily expressed their concern about potential contamination coming from the lab's trash bin.<sup>28</sup> And it satisfies the city government's requirements that hospital trash be reduced to ashes in hermetically sealed kilns.

In this forensic lab, however, bone fragments and tissue from unidentified dead bodies has never been assimilated into the hospital refuse, and so, between different make-shift solutions that have provided occasional relief, these left-over test materials have tended to accumulate in the lab's limited storage space.

To manage the quantity of incoming tissue samples, keeping it within reasonable limits, it had long been lab policy to deal only with 'closed cases' – that is, examinations in which both the questioned and reference materials are available. In a 2012 memo, in response to a demand from state authorities, the lab director reiterated this limitation, stating that the IPPGF could not accept 'open cases' precisely because it didn't have the necessary infrastructure to stock the potentially large number of samples that might be useful at some future date. The November 2015 letter mentioned above, in which the lab agreed, in principle, to receive the 'questioned samples' of all the state's unidentified corpses, whether or not they come with the name of a possible relative, represents an about-face in policy. The lab director made clear, however, that the lab could not possibly begin receiving open cases until certain issues were resolved.

One apparently simple question concerned the cold-storage chamber, which had been having problems since at least 2011. To maintain their viability as test samples and avoid complete degradation, biological tissues should be protected from the Rio de Janeiro heat. However, despite several attempts to repair the motor, as well as investigation of the possibility of installing an independent generator that might guarantee refrigeration in the event of an electricity outage, it was impossible to assure the regular functioning of the cold-storage chamber. Repeated written requests for institutional support did not receive priority attention from the police authorities, with the result that the lab continued to rely on the limited space provided by household-style refrigerators and freezers to preserve stored tissue.

With physical plant and personnel likely to remain in place in the foreseeable future, the only way that the lab could free up space to accommodate the growing quantity of new cases would be to clean out the backlog of 'old samples'. This material included bone fragments, patches of human tissue and other biological vestiges that had already yielded a clear DNA profile – either confirming a match with some reference sample or, after a second identical test result, sealing and 'exclusion'.<sup>29</sup> The DNA extractions, carefully preserved in polypropylene microtubes, took up minimal space in the lab's refrigerator. The original biological samples – bone or tissue fragments – were taking up considerably more space.

Professionals in the lab had considerable doubt about the usefulness of this material. Only once in its more than ten years of existence had the lab received a request



to run a retest, and the procedure had merely confirmed previous results. On top of everything else, most of the older biological samples, stored in the out-of-service cold chamber, had deteriorated beyond any hope of ever providing a clear test result. In other words, circumstances had conspired to nudge these materials more and more toward the category of inconvenient trash. And yet, there still remained serious objections to throwing these cadaver parts into any sort of trash bin.

### Talking bones: body fragments as court evidence

Until 2011 the lab had followed a relatively simple administrative procedure to dispose of biological materials that had no further use. Once or twice a year a commission of professionals designated to oversee this procedure would establish a list of 100 to 150 already-examined materials to be inhumed, recording the origin of the sample, the penal court that had solicited the test and the case number of each item. Following submission of the list to the proper administrative authorities, permission was routinely granted to move the material out. In 2011, just as the new congressional Bill was being launched, things began to get more complicated.

Early that year the lab commission had sent a petition to the Superintendent of Scientific Police with a list of precisely enumerated samples and a well-justified explanation as to why the material should be discarded. The routine request came back two weeks later with a hand-written note from the superintendent in which he expressed serious concerns about destroying evidence.<sup>30</sup> Aside from demanding an added assurance that the samples were useless, he wanted to know what laws existed to regulate the matter. Over the next few months, in a saga that involved innumerable legal specialists, there followed an intensive search for a relevant law – all in vain. A 1992 law on the use of unidentified cadavers for teaching and scientific investigation mentions nothing about what is to be done with the body (or its parts) once it is no longer needed. As a judicial consultant for the Superintendent of Scientific Police explained in his hand-written memo: ‘[on the subject of what to do with left-over sample materials] all I could find was a 2005 federal law about the disposal of genetically modified organisms.’<sup>31</sup> After consulting forensic labs in other states, the lab director affirmed in his own written contribution to debate that there was no law in existence on this matter: ‘Some states, stocking material in refrigerators and freezers to the limit of their capacity, risk causing a public health problem in the near future.’

Finally, in early April 2011, the state police’s judicial consultant decided that, as court evidence, the biological samples did not belong to the police lab but, rather, to the judges and district attorneys who had tried each case. As a result, it was decided that before discarding any biological sample the lab should have written permission from the major legal authorities involved in each individual case. It should be noted that if one counts the penal courts throughout the state of Rio de Janeiro (any of which might have called upon the expertise of the IPPGF), this process could involve over 100 different judges and an equal number of district attorneys. However, judging from the near total lack of response to the lab director’s insistent petitions, these

agents showed little interest in giving an opinion. The result was a kind of impasse in which, barring any clear norm, the people closest to the immediate problem – i.e. the lab professionals – sought to resolve the question according to their own pragmatic needs.

The forensic specialists found it hard to understand why the judicial authorities were so attached to the bulky, and by now mostly malodorous, biological samples. Why, they wondered, would a piece of bone be considered more solid proof than the DNA extract? The authenticity of a chunk of muscle tissue or a sliver of bone can be open to doubt, no less than that of the microtubes of DNA. After all, who guarantees that the tissue fragments come from the cadaver that the documents indicate? And how are we to be sure that the cadaver is the same that police reports have described? Why, in this chain of custody riddled with possible flaws, would the tissue sample take on such central importance?

The forensic archaeologist Zoe Crossland<sup>32</sup> brings helpful insights to this question. She reminds us that well before the nineteenth-century emergence of an ‘evidential paradigm’ cadavers had been considered important sources of information. Especially in the case of murder victims, tales of the ‘limber and accusing corpse’ told of how the dead body (or some part thereof) would somehow point a finger, revealing the assassin’s identity. These ‘talking bones’ appeared to carry a sort of ghost-effect, manifesting the residual influence of the deceased individual’s personality. Crossland suggests that this view is altered by the consolidation of a modern mode of forensic investigation that sees dead bodies as ‘objectified evidence’, material that yields information independent of any personal history or social context. Together with the rise of a new class of professionals, the cadaver becomes an object of expertise – a gold mine of autonomous body parts capable of revealing truths (and lies) well beyond the ken of the victim him- or herself. And yet, dead bodies continue to be seen as something more than evidence. Constructed within a network of complex relations that involves archaeologists, living relatives, the courts and police and the person or persons accused of the crime, the human body parts retain something of their haunting ability to speak:

The body is produced as evidence, as something from which the scientific observer must remain detached. Yet, in ascribing human remains with the ability to speak (truthfully) about their histories, the metaphorical discourse of ‘bodies as evidence’ attributes the dead with agency and transfers the feelings and emotions denied to the forensic observer to the corpse.<sup>33</sup>

The ambivalent feelings described by Crossland are produced by an object that – through its appearance, smell and palpability – evokes the idea of something human, no matter what its degree of decomposition. Because of this indexical referentiality, fragments of human bone and tissue appear to produce a truth-effect well beyond that of aseptic polypropylene microtubes containing extracts of DNA. In the case under analysis, the judiciary’s insistence on seeing the body fragments as a superior form of material proof raises the hypothesis that ‘talking bones’ still have the power to haunt even the most modern of scientific technologies.

## Putting human remains to rest

Faced with lack of response, indifference and even outright opposition from administrative superiors, the professionals at the forensic lab explored other channels that might help them to dispose of the body fragments. The majority of bone and tissue samples sent in for examination came from one of the state's public morgues. For years, left-over materials had simply been returned to the city morgue – where they would be dispatched for inhumation alongside unclaimed cadavers. During 2015, however, this outlet was shut off. The returned material was refused at the morgue's front gate, with the receptionist's explanation: 'Nowadays, it's a problem to get rid of our own stuff! How are we to take on another lab's discards?'

In fact, it had never been entirely clear to lab administrators just how the morgue went about disposing of the human fragments it had been sent. They had presumed that the material was buried in a public cemetery, arranged in all likelihood through an informal agreement. Perhaps the cemetery accepted the material as a public service, without charge, incorporating the fragments into a collective ossuary or incinerating them together with the remnants of age-old tombs. Until recently the Santa Casa da Misericórdia – a private philanthropic institution – had coordinated the administration of nearly all the city's cemeteries, even after its official contract had run out in 2009. However, in 2013 the police uncovered a scheme for the illegal sale of burial plots at exorbitant prices and the ensuing investigation resulted in the city contracting entirely new administrative entities. It would not, then, be surprising that the new administrators failed to honour previous informal agreements, thereby complicating the inhumation of various forms of human remains coming from the city's morgue and forensic labs.

One way or another, the director of the genetics lab had a problem to solve. To underline the seriousness of the situation he evoked the clumsy cover-up operations used by the Brazilian military regime (1964–85) to erase traces of their crimes: 'What am I to do with these human remains? Throw them into Guanabara Bay like the military used to do with the bodies of their victims?' On his own initiative he made contact with the public cemetery of a small town in the nearby mountains, successfully securing a place for the inhumation of the fragments. Nonetheless, following protocol, he needed to find some way of officially transporting the material. And, at the time, the lab's two cars (one of them over ten years old) were unusable for lack of routine maintenance (threadbare tyres, weak batteries, worn-out brakes and faulty electrical circuits).<sup>34</sup>

This impasse went on for nearly two years until the problem finally leaked out to the media.<sup>35</sup> News stories presented the problem as a scandalous disregard for evidence, pronouncing that without the immediate reactivation of the cold-storage chamber all sorts of proof would be lost forever. The lab director, recognising that the materials had long since deteriorated beyond use, simply wanted the cold-storage chamber to be cleaned out and restored to use. Under pressure of the publicity, the Superintendence of Scientific Police decided to support the lab director's efforts and help to cut the red tape. In a first round of discussion the morgue authorities maintained that the left-over bits and pieces of cadavers could

be disposed of together with the other kinds of hospital waste that were picked by the specialised commercial service. The suggestion was rejected on the grounds that these particular human tissues merited a more dignified treatment. Permission was then granted for the removal of the materials to the small-town public cemetery previously contacted by the lab director. The question now was how to handle and transport the potentially toxic materials.

By now, the Rio de Janeiro heat had done its work and the gases emitted by the human tissues stored for months, if not years, without refrigeration required attention before any worker could venture into the deactivated cold-storage chamber. Federal specialists on biological warfare were summoned to check the degree of danger. An army squadron, duly suited up with gas masks, diagnosed a mere accumulation of ammonia and promptly absolved themselves of any further responsibility. At this point one of the lab's specialists remembered that she had recently met a congenial member of the firefighters' brigade who might agree to help. And so, during the last week of July 2017 an entire unit of firefighters rolled up and cleaned out the cold-storage chamber, carting off to their vehicle twelve cadaver-sized bags of material, bursting at the seams. The Superintendent of Technical Police, still nervous about losing evidence, demanded that a police unit should accompany the proceedings, recording on film what would be classified as an 'atypical incident'. Finally, the overloaded fire truck, its doors lashed shut, headed out to the mountain-side cemetery where the body fragments, hopefully, would find their final resting place.

### Concluding remarks

Rather than 'articulating bones',<sup>36</sup> looking to reconstitute the living subject previously attached to these material objects, the specialists involved in forensic analysis break down the organic samples that they receive into smaller and smaller components. With each successive step, attention moves further away from the original 'human', in the direction of an aseptic, abstract code. In the process, the materiality of personhood fades into the background. Bones and tissue fragments become junk – useless trash to be got rid of. As these materials are put to one side, transformed by the work of time, they lose even the allure of a scientific specimen. In these circumstances the smell of rotting organic material takes over and the connotation of something ex-human, rather than enhancing the sacred, appears to render the object repugnant.

The attention to disincarnated detail described here is no doubt due in part to the specialists who have learned to think in such terms. However, one wonders if the fading of personhood doesn't have something to do with the generally low status of the individuals whose remains pass through the hands of forensic specialists – people who, even in life, were easily forgotten or overlooked. Some were street dwellers; many were involved in drugs and organised crime. The family relatives who pass through the lab's corridors, coming to furnish spittle for a potential DNA match, are very often people of modest origins who are unaccustomed to questioning authorities. Furthermore, since they never see nor touch the original tissue sample it seems

to occur to no one to inquire into the whereabouts of the organic remnants of their loved ones. The re-articulation designed to reveal an individual's identification and the piecing together of a history of his or her demise appear to produce an erasure of the very materials taken from the cadaver that allowed for the completion of the process.

The tribulations that confronted the team of forensic specialists attempting to rid the lab of these residues reveal a heterogeneous group of actors involved in the production of bone and tissue fragments. Here we have a clear illustration of the relational materiality evoked at the beginning of this article. Everything – from clogged-up cemeteries and broken down cars to social clout, political corruption and memories of the dictatorship – seems to have an influence on the strategies involved in the redeployment of the lab's fragments of dead bodies. For some, such as the morgue administrators, the body patches are strategised as not fully human. Like expelled placentas, pulled teeth and post-operative tumours, they have been assimilated to waste products that can be discarded with little ceremony in the trash bin. For authorities leery of legal complications, the materials have an imagined future as evidence and so – just as documents, gun bullets and fingerprints – they should be carefully preserved in their original form. Geneticists appear to see the materials as part of a scientific network – samples to be scrutinised, mined for a DNA extraction and, when no longer useful, put aside to make room for new activities. DNA itself proves to be an active agent. The sophistication of this technology – permitting organic fragments to bear witness, providing relevant information long after the crime was committed – opens the possibility of appealing sentences even decades after the original trial. At the same time, it poses new problems for the definition and treatment of evidence.

As Law and Mol suggest, 'each of these stories is about a different strategy. That is, it's about another way in which materiality is distributed, in a specific place, according to a specific logic.'<sup>37</sup> Yet none of these manifold and decentred materialities can be considered secure. Dynamic socialities – the invention of new uses for DNA, the degradation caused by summer heat, or even new alliances formed in response to newspaper scandals – lead materialities to shift. The dilemma confronted by the forensic genetics lab reminds us not only how some corpses are endowed with more personhood than others, but also how the very distinction between human remains and trash depends on a patchwork of multiple logics that does not necessarily perform according to well-entrenched or predictable scripts.

## Notes

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- 2 E. Anstett and J. M. Dreyfus (eds), *Human Remains and Identification. Mass Violence, Genocide, and the 'Forensic Turn'* (Manchester, Manchester University Press, 2015).
- 3 O. Starn, *Ishi's brain: in search of America's Last 'Wild' Indian* (New York, W. W. Norton & Company, 2004).

- 4 D. Diniz, 'Avaliação ética em pesquisa social: o caso do sangue Yanomami', *Revista Bioética*, 7:2 (2007), 284–97.
- 5 K. Tallbear, *Native American DNA: Tribal Belonging and the False Promise of Genetic Science* (Minneapolis, University of Minneapolis Press, 2013).
- 6 M. Lock, *Twice Dead: Organ Transplants and the Reinvention of Death* (Berkeley, University of California Press, 2001).
- 7 Institute for Research and Expertise in Forensic Genetics, administered within the state's executive branch. The lab was inaugurated in 2005; the most senior professionals (such as the director and one of the technicians involved in this conversation) began their work in 2008.
- 8 See, for example, P. Rabinow, 'American Moderns: On Sciences and Scientists', in P. Rabinow, *Essays on the Anthropology of Reason* (Princeton, Princeton University Press, 1996), pp. 162–88; M. Fortun and H. J. Bernstein, *Muddling Through* (Washington, DC: Counterpoint, 1998).
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- 14 *Ibid.*, 282.
- 15 T. Laqueur, 'Mourning, Pity, and the Work of Narrative in the Making of "humanity"', in R. Wilson and R. Brown (eds), *Humanitarianism and Suffering: The Mobilization of Empathy* (Cambridge, Cambridge University Press, 2009), pp. 31–57.
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- 17 M. Sappol, *A Traffic of Dead Bodies: Anatomy and Embodied Social Identity in Nineteenth-century America* (Princeton, Princeton University Press, 2001).
- 18 C. Hodge, 'Non-bodies of Knowledge: Anatomized Remains from the Holden Chapel Collection, Harvard University', *Journal of Social Archaeology*, 13:1 (2013), 122–49.
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- 20 CONAMA (Conselho Nacional do Meio Ambiente), *Resolução Conama nº 335, de 3 de abril de 2003: Dispõe sobre o licenciamento ambiental de cemitérios*, accessible at: [www2.mma.gov.br/port/conama/legiabre.cfm?codlegi=359](http://www2.mma.gov.br/port/conama/legiabre.cfm?codlegi=359) (accessed 21 March 2019).
- 21 In 2014, according to internal registers, the lab ran slightly over 350 samples, of which over 70 per cent concerned unidentified cadavers.
- 22 Microwave is the term used by police and popular media to refer to this sort of gang-related execution.

- 23 C. Fonseca, 'Mediações, tipos e configurações: Reflexões em torno do uso da tecnologia DNA para identificação criminal', *Anuário Antropológico*, 2013:1 (2013), 9–33.
- 24 R. G. Garrido and E. L. Rodrigues, 'O Banco de Perfis Genéticos Brasileiro Três Anos após a Lei nº 12.654', *Revista Bioética y Derecho*, 35 (2015), 94–107.
- 25 See M. C. Lynch and R. S. McNally (eds), *Truth Machine: The Contentious History of DNA Finger Printing* (Chicago, University of Chicago Press, 2008) for more on these promises.
- 26 Polymerase chain reaction (PCR) is a laboratory technique used in molecular genetics to amplify or make multiple copies of a segment of DNA, thus facilitating analysis.
- 27 It should be noted that, as in the vast majority of public and private spaces in Brazil, the lab also has to dispose of bathroom trash – used toilet tissue that the sewage system is unable to absorb. This question, itself worthy of reflection, is not specific to the forensic genetics lab and so will not be pursued here.
- 28 For example, on one occasion bloodied paper in bathroom discards provoked worries among employees at the state police museum next door.
- 29 In rare situations the test results – even after a retest – had proved inconclusive. In such cases, the original biological samples were carefully filed away to await a time in the future when more refined technologies might yield decisive results.
- 30 The implicit reference of this concern is the well-known article 170 of the *Código de Processo Penal*: 'Nas perícias de laboratório, os peritos guardarão material suficiente para a eventualidade de nova perícia' ('Concerning laboratory examinations, the specialists should keep enough material for the eventuality of a new test').
- 31 In fact, subsequent research revealed Resolution 358, emitted by the National Council of Environment in 2005, referring specifically to necrotariums and the services of forensic medicine, and recommending that, whenever possible, anatomical pieces of human bodies should be buried in cemeteries or duly incinerated. However, this resolution was not mentioned at the time.
- 32 Z. Crossland, 'Of Clues and Signs: The Dead Body and Its Evidential Traces', *American Anthropologist*, 111:1 (2009), 69–80.
- 33 *Ibid.*, 75.
- 34 See Secretaria Nacional de Segurança Pública, *Diagnóstico da Perícia Criminal no Brasil* (Brasília: Ministério de Justiça/Secretaria Nacional de Segurança Pública, 2012) for a federal report showing that this precarious situation was not unusual in other forensic labs throughout the country.
- 35 By then, the left-over tissue fragments occupied some ten cubic metres. Considering that a domestic freezer routinely holds up to 150 litres, it would take nearly seventy such machines to keep this quantity of organic material from degrading. The lab had neither the space nor the financial means to acquire and stock such equipment.
- 36 E. Hallam, 'Articulating Bones: An Epilogue', *Journal of Material Culture*, 15:4 (2010), 465–92.
- 37 Law and Mol, 'Notes on Materiality and Sociality'.